Wolff-Alport Chemical Corporation Remedial Investigation Data Presentation

October 13, 2016

458624

Agenda

- Meeting Objectives
- Previous Investigations
- Site History/Conceptual Site Model
- EPA Remedial Investigations 2015-2016
- Summary of Findings
- Risk Assessment Update
- Path Forward
- Questions

Meeting Objectives

- Present Conceptual Site Model
- Review Remedial Investigation Findings
- Discuss path forward on the Remedial Investigation Report

Previous Investigations/Interim Remedy

- 2007: NYCDOHMH and NYSDEC Investigation
- 2009-2010: NYCDDC Investigations
- 2012 to Present: EPA Investigations
- 2013: NYCDEP Sewer Investigation
- 2013: Multi-Agency Neighborhood Radiological Assessment (NYSDOH, NYCDHMH, EPA)
- 2013: EPA Interim Remedial Actions
  - lead and concrete shielding
  - concrete and gravel cover

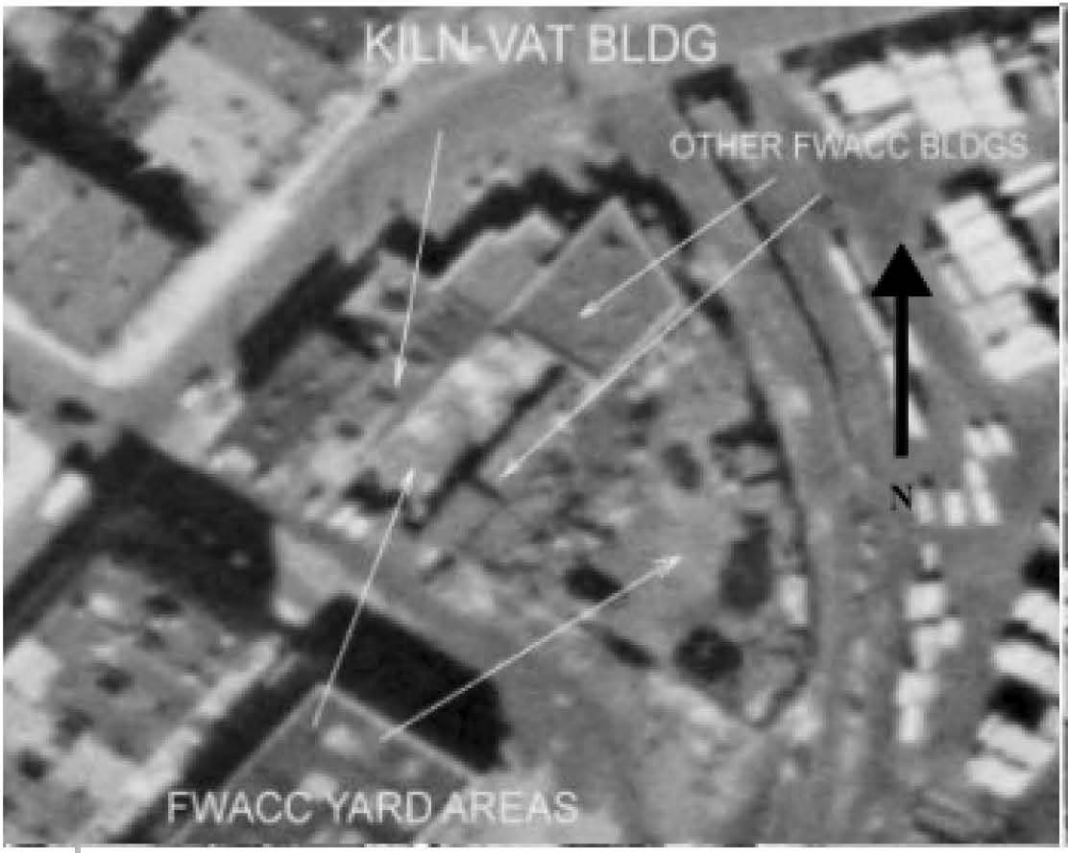
Site History/ Description

Site History

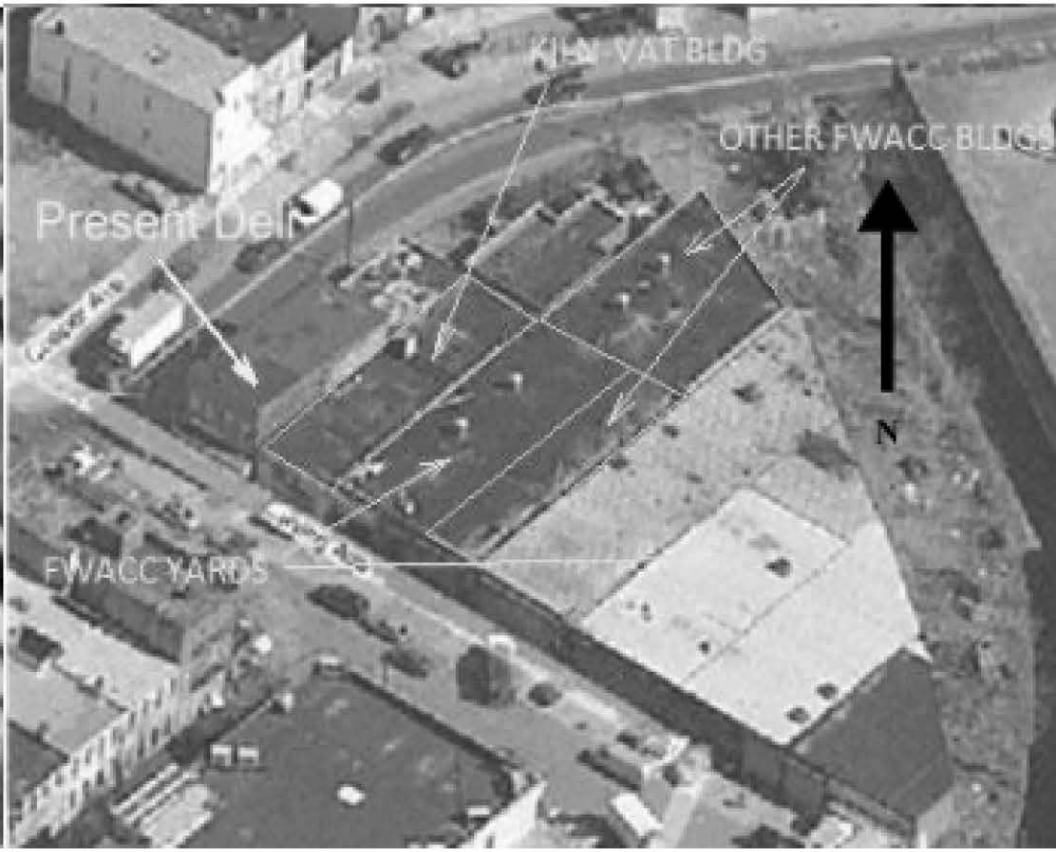
- Wolff-Alport Chemical Corporation Operations (1920s – 1954)
  - Imported monazite sand (via rail spur) for rare earth metals extraction
  - Monazite contains approximately 6% to 8% or more of thorium
  - Processed using sulfuric acid which created a **thorium sludge waste product and tailings**
- Until 1947, WACC disposed of thorium waste in the sewer (process liquors) and possibly by burial on the property (waste tailings)
- 1948-1954 – thorium precipitated as thorium oxalate sludge and sold to the Atomic Energy Commission

Historical Facility Layout

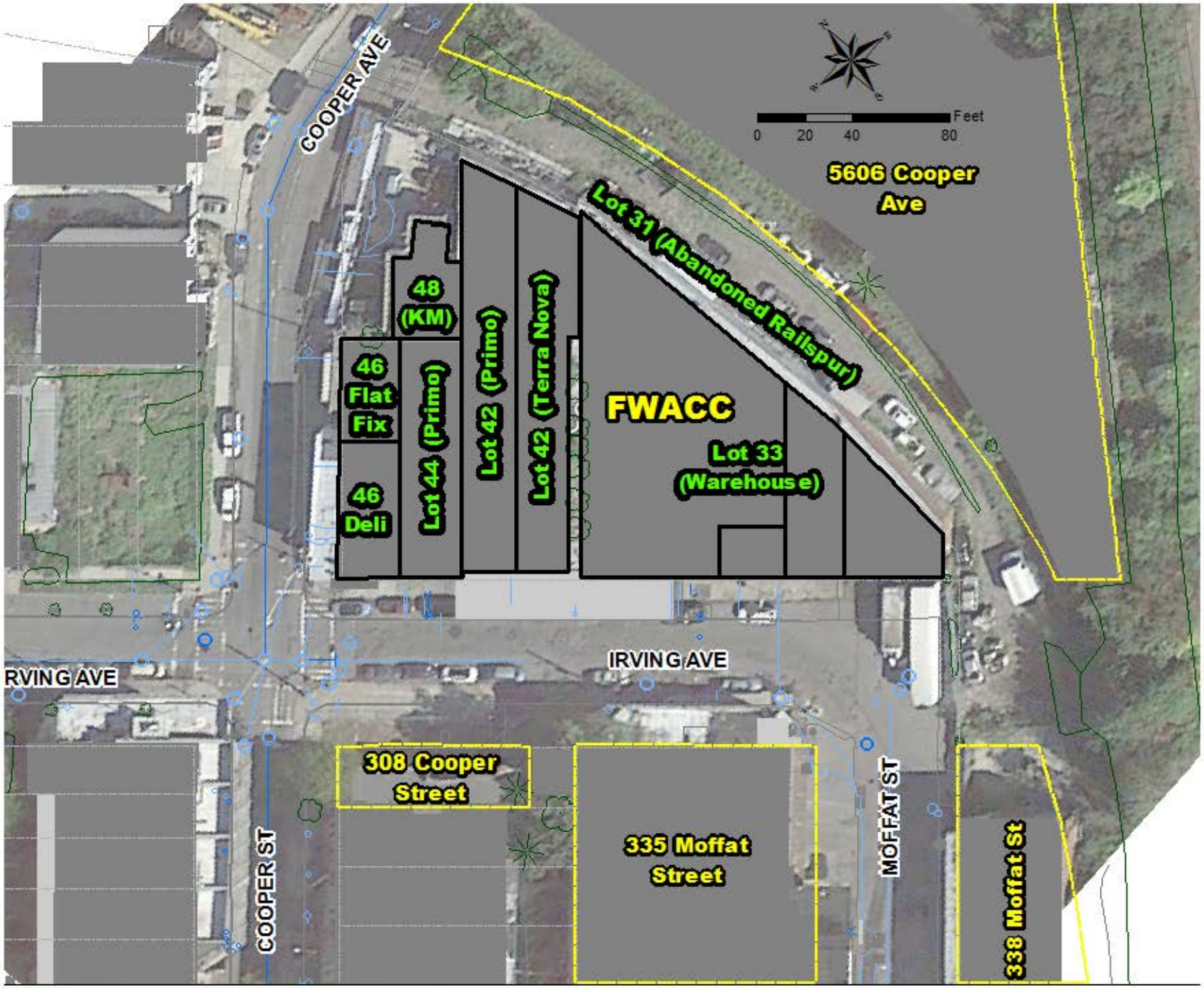
1954



2007

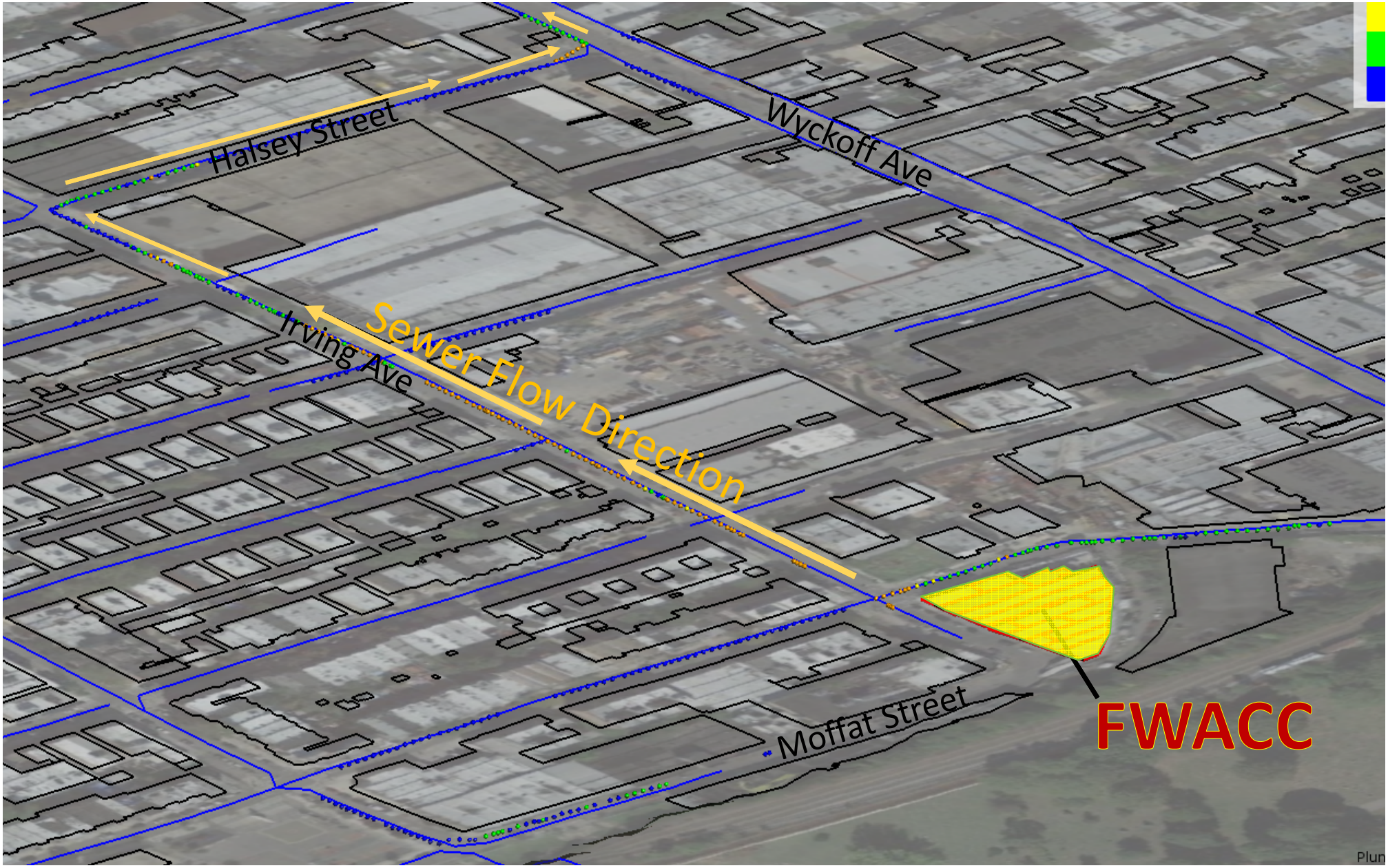


FWACC Area

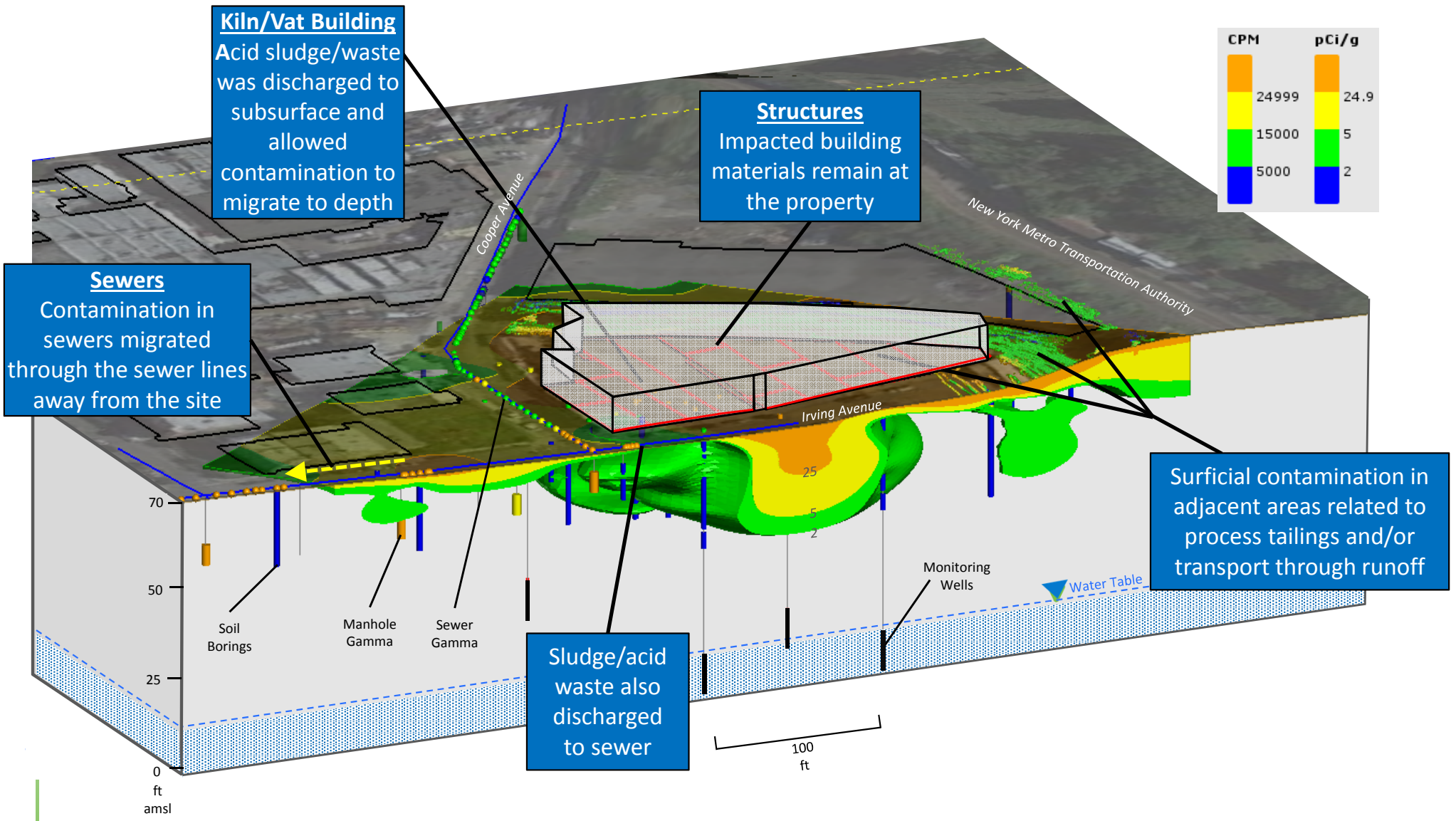

COOPER AVE
Feet
0 20 40 80
5606 Cooper Ave
Lot 31 (Abandoned Railspur)
48 (KM)
46 Flat Fix
46 Deli
Lot 44 (Primo)
Lot 42 (Primo)
Lot 42 (Terra Nova)
FWACC
Lot 33 (Warehouse)
RVING AVE
IRVING AVE
308 Cooper Street
335 Moffat Street
COOPER ST
MOFFAT ST
338 Moffat St

Nearby Properties

Sewer Line


Halsey Street
Wyckoff Ave
Irving Ave
Sewer Flow Direction
Moffat Street
FWACC

Conceptual Site Model – FWACC



2015/2016 EPA Remedial Investigation

RI Investigation Objectives

- Define the nature and extent of contamination
  - Building materials
  - Soil
  - Sewer
  - Sediment (Newtown Creek Outfall)
  - Groundwater
- Investigate radon/ thoron in School and Daycare
- Collect data to support
  - RI Report
  - HHRA
  - SLERA
  - FS

Were Objectives Met?

- Data filled in gaps and confirmed conclusions from previous investigations
- Enough data has been collected to complete the RI/FS and risk assessments for the site

Initial Conclusions

- **Building materials** – Contamination remains in the building structures at FWACC
- **FWACC Soils** – Highest levels of contamination in soil remain below the processing areas of FWACC, to depths less than 25 feet bgs
- **Adjacent areas** – Surficial soils impacted in the former railspur area, below the road and sidewalks on Irving Ave and Moffat Rd, and along the elevated rail line to the east
- **Sewer** – Irving Ave sewer line impacted due to WACC disposal practices from Moffat St to Eldert St

Initial Conclusions

- **Sediment (Newtown Creek Outfall)** – Th-232 concentrations elevated at outfall; limited to area immediately adjacent to discharge
- **Groundwater** – limited radiological contamination detected
- **School and Daycare** – radon/ thoron sampling, exposure measurements and soil borings detected no contamination
- **Gamma Exposure Rates** – elevated exposure rates found within buildings, on sidewalks, and on the streets near the FWACC property

Remedial Investigation Activities

- **Background Studies**
  - Background gamma walkover surveys
  - Surface and subsurface soil
  - Sewer – gamma scans
  - Creek sediments –locations in Coney Island Creek

- **FWACC Property – Building Investigation**
  - Gamma surveys of walls, floors, ceiling, exterior walls, roofs
  - Total/ Removable Alpha Surveys
  - Building Material Sampling
  - Hazardous Materials Survey
    - Evaluated presence of asbestos-, lead-, mercury-, and PCB-containing materials

Remedial Investigation Activities (cont.)

- **Soil investigation**
  - Gamma walk-over surveys
  - Soil boring sampling
    - 72 shallow (~ 10 ft), 6 deep (~ 30 ft), and 5 rotosonic locations (wells)
    - Borehole and cores scanned and continuous soil samples collected for radiological and chemical analyses

- **Sewer Investigation**
  - Fiberscope mapping and gamma scan of sewer pipe
  - In-manhole gamma and exposure rates
  - Sewer sediment and material sampling
  - Sewer soil borings (9 boring locations)
    - Continuous soil samples collected to depths below the sewer inverts

Remedial Investigation Activities (cont.)

- **Newtown Creek Outfall Sediment Sampling**
  - Vibracore sampling at 8 locations
    - Cores scanned and continuous soil samples collected for radiological analyses

- **Groundwater Investigation**
  - 5 wells installed to ~ 75 ft bgs
    - Monitoring wells gamma logged and slug tested
    - 2 rounds of groundwater sampling for radiological and chemical parameters

- **School Radon/Thoron Surveys**
  - PS/IS 384 at the corner of Moffat Street and Wilson Avenue
    - Short-term sampling with charcoal canisters
    - Long-term sampling with alpha-tracking detectors (ATDs)
  - Audrey Johnson Daycare on Moffat Street
    - Short-term sampling with charcoal canisters

Remedial Investigation Activities (cont.)

- **Gamma Exposure Rate Confirmation Survey**
  - Interior Exposure rates throughout the FWACC buildings
  - Exterior Exposure rates outside of the FWACC buildings but within the property and several blocks of the Site where data was collected during previous investigations for confirmation

Screening Criteria

Development of RI Screening Criteria

- Non-Radiological Analyses (Chemical)
  - Soil: NYSDEC SCOs and EPA RSLs
  - GW: NYSDEC Class GA and EPA Primary Drinking Water Standards
- Radiological Analyses
  - Soil/ Sediment – Developed from site background sampling (95% UTL)
  - Radon/ Thoron – Developed based on the 95% UTL calculated from NYSDOH on-going radon data collection study
  - Groundwater – 40 CFR 141.15 Maximum contaminant levels for Ra-226, Ra-228, and gross alpha particle radioactivity in community water systems

Key RI Screening Criteria

Soil/ Solids

- Ra-226 – 0.92 pCi/g
- Th-232 – 1.22 pCi/g

Creek Sediment

- Ra-226 – 0.80 pCi/g
- Th-228 – 0.76 pCi/g
- Th-230 – 0.70 pCi/g
- Th-232 – 0.64 pCi/g
- U-234 – 1.28 pCi/g
- U-235 – 1.2 pCi/g
- U-238 – 1.06 pCi/g

Groundwater

- Ra-226/ Th-232 combined - 5 pCi/L

Indoor Air

- Radon (basement) – 3.4 pCi/L
- Radon (first floor) – 1.15 pCi/L
- Thoron (basement) – TBD
- Thoron (first floor) – TBD

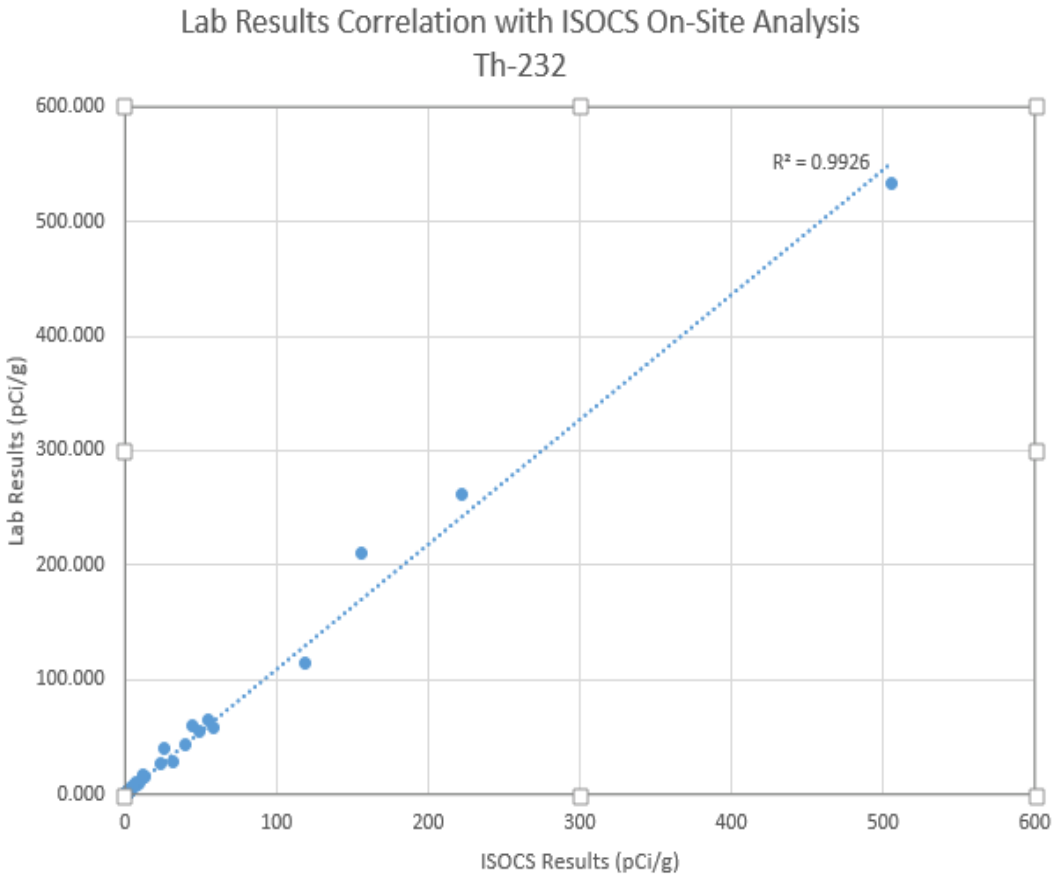
Outdoor Air

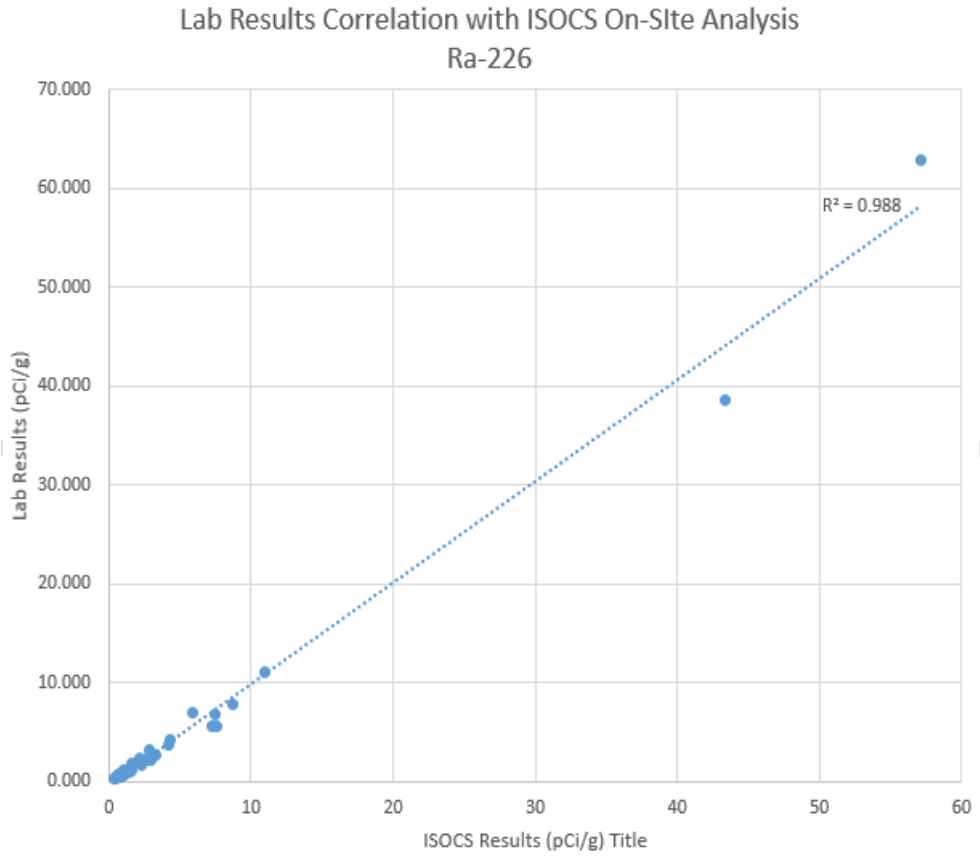
- Radon – 0.19 pCi/L
- Thoron – 0.16 pCi/L

Data Use

Data Use

- Data usability report concluded that data is usable.
- ISOCs data sets were compared to the laboratory confirmation samples, and it was determined the ISOCs results were useable.





Break

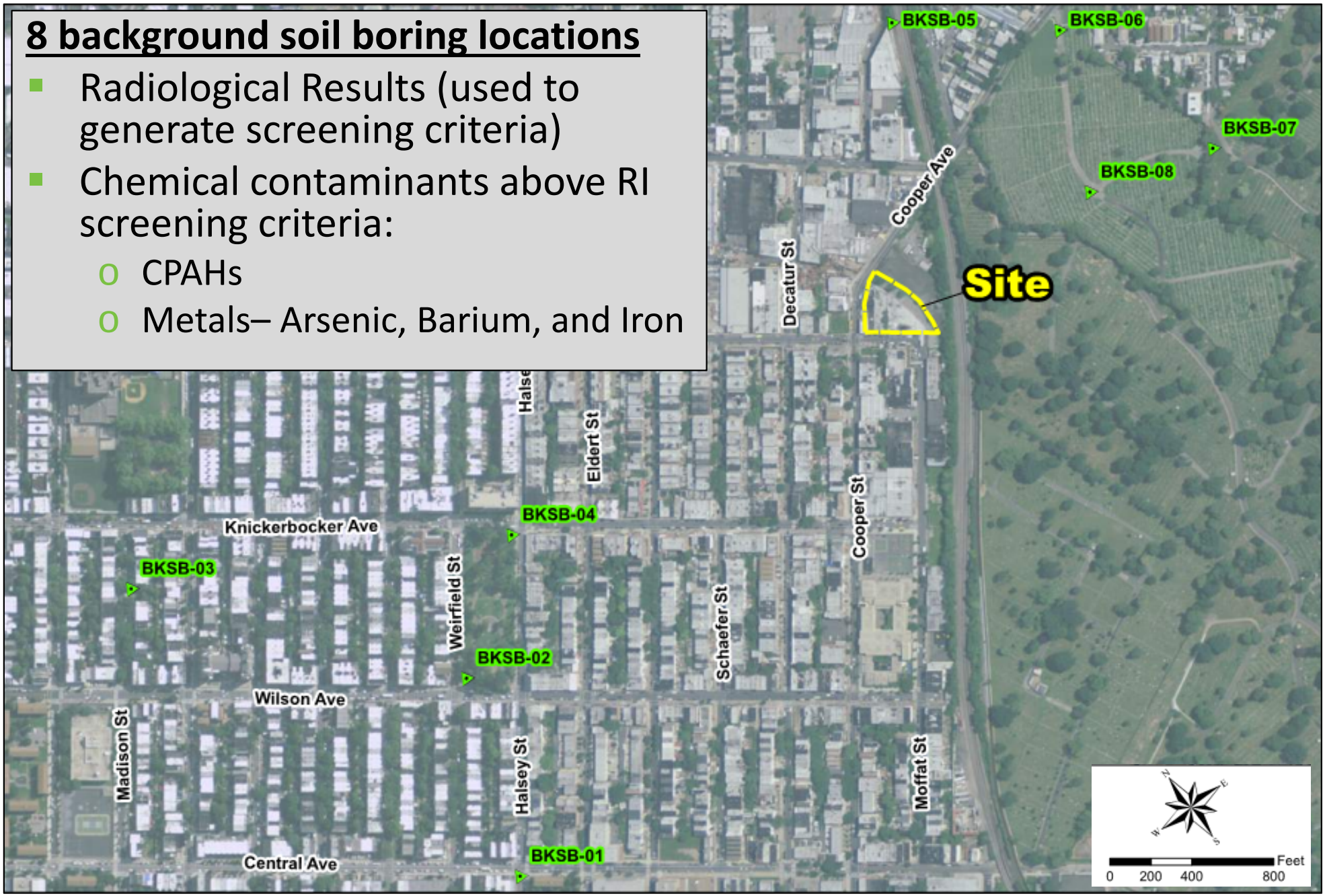
Results

FWACC Background Studies

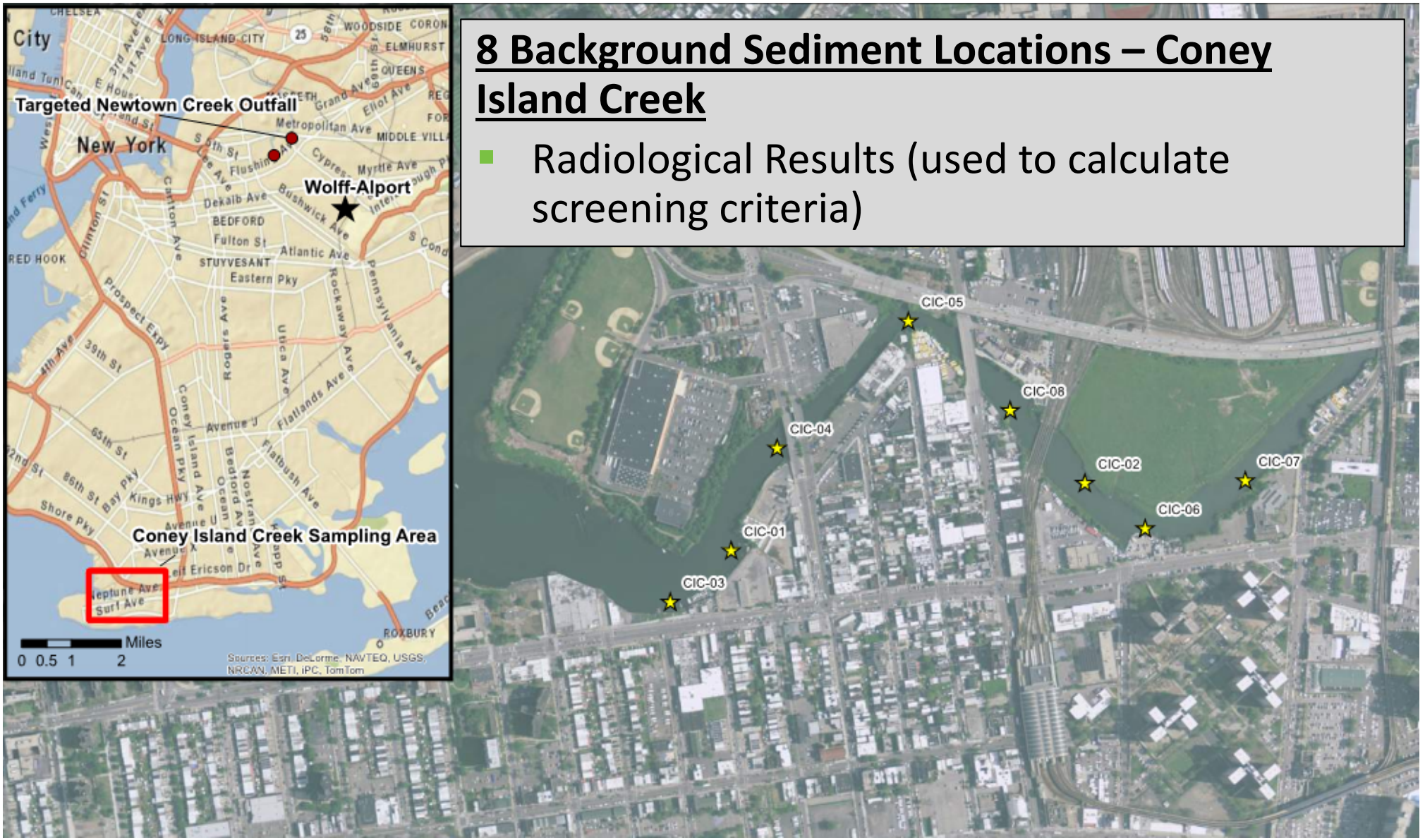
Background Soil Sampling

8 background soil boring locations

- Radiological Results (used to generate screening criteria)
- Chemical contaminants above RI screening criteria:
  - CPAHs
  - Metals– Arsenic, Barium, and Iron



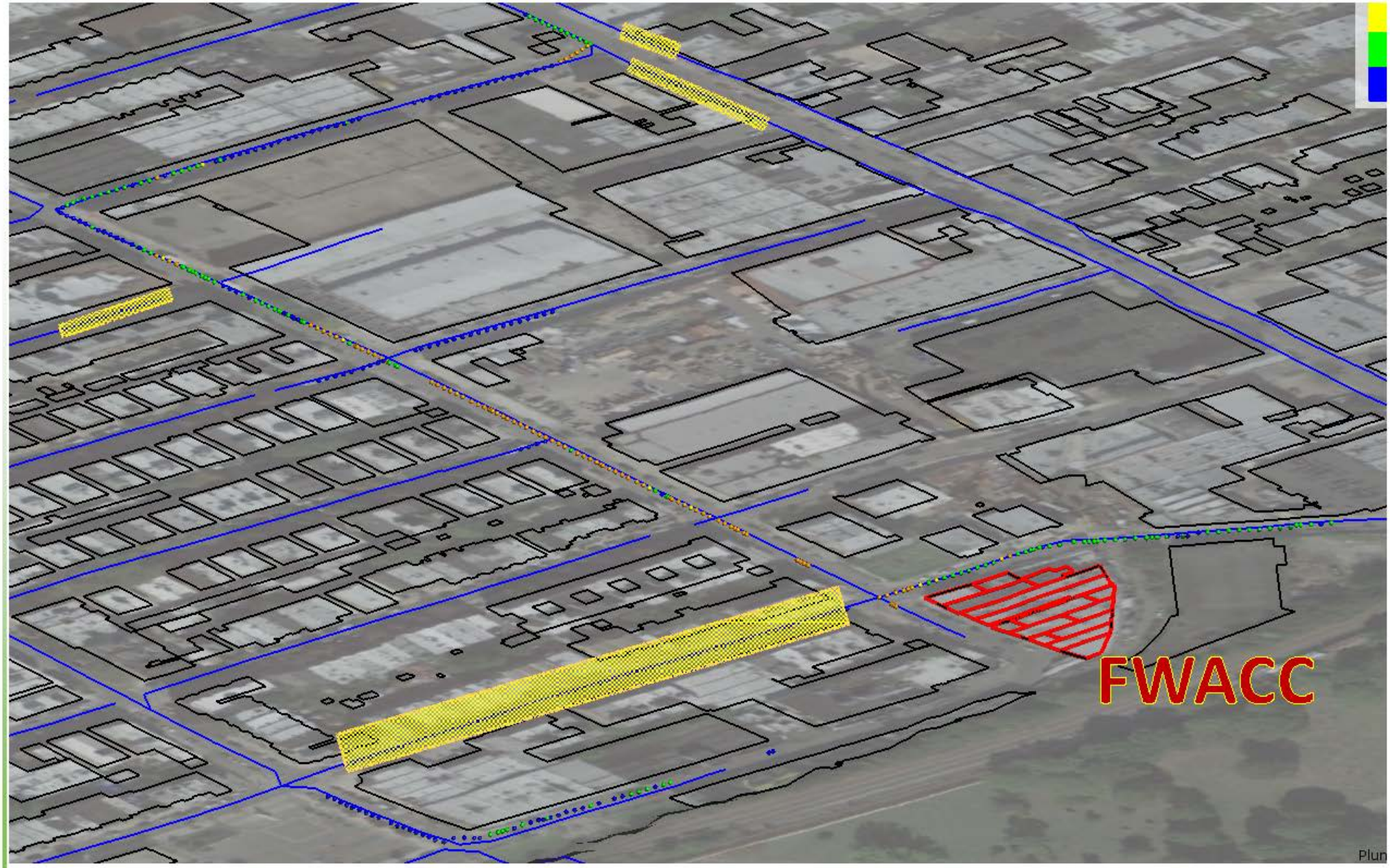
Background Sediment Locations



8 Background Sediment Locations – Coney Island Creek

- Radiological Results (used to calculate screening criteria)

Background Sewer Locations



Other Background Studies

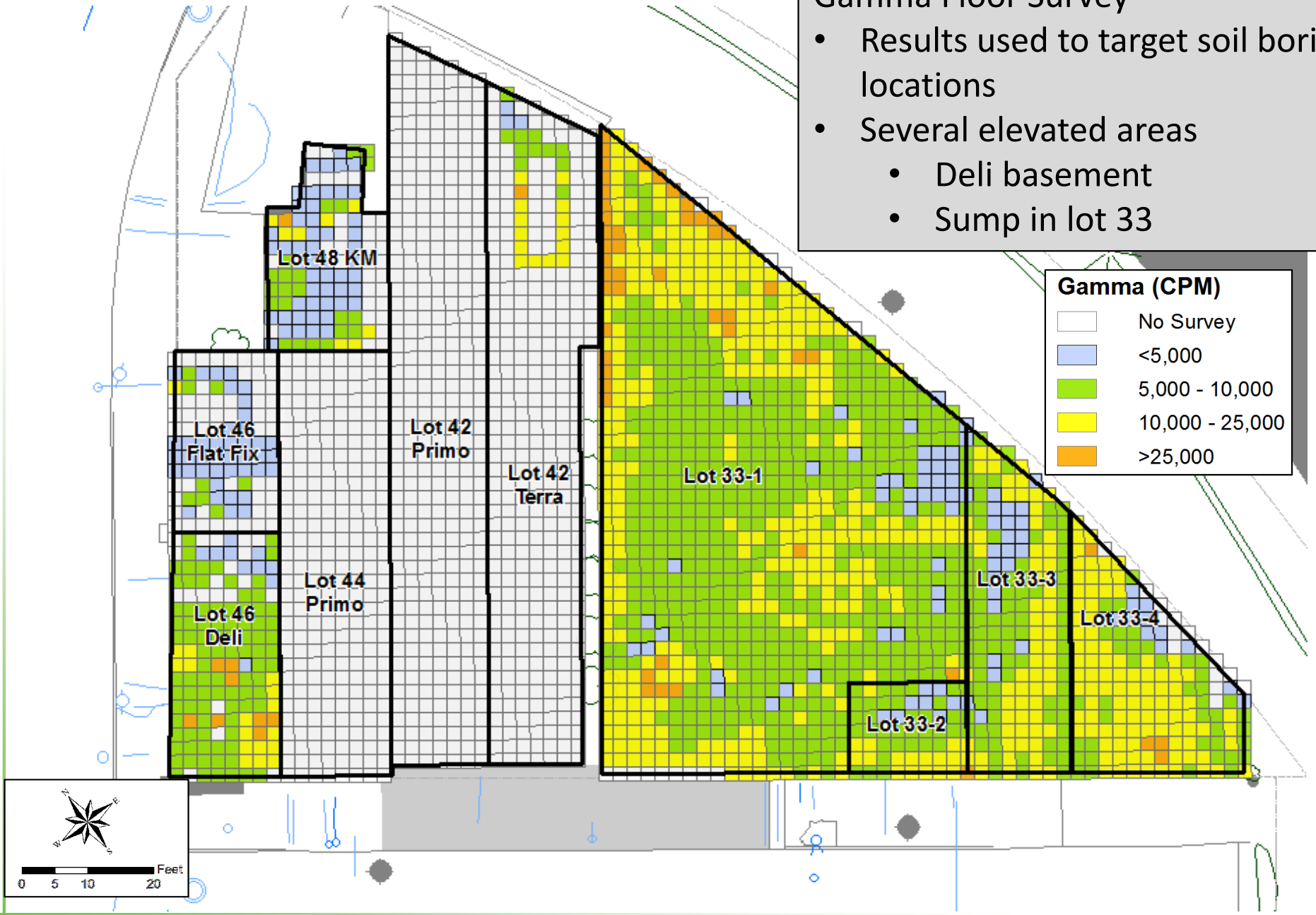
- Background gamma walkover surveys (2x2 collimated NaI probe)
  - Asphalt – ~5,500 cpm
  - Sidewalk– ~2,500 cpm
  - Grass/Dirt – ~3,500 cpm
- Background gamma sewer surveys
  - Pipe (1x1 NaI detector with Ludlum 44-2 probe/2221 meter)
    - 12” clay – ranged from 4,100 cpm to 4,400 cpm
    - 18” concrete – ranged from 3,800 cpm to 4,700 cpm
    - 24” clay – ranged from 3,900 cpm to 4,900 cpm
  - Manholes (in manhole with 2x2 NaI detector with Ludlum 44-10 probe/2221 meter)
    - Concrete – ranged from 1,500 cpm to 4,500 cpm
    - Brick – ranged from 2,000 cpm to 4,900 cpm

FWACC Building Investigation

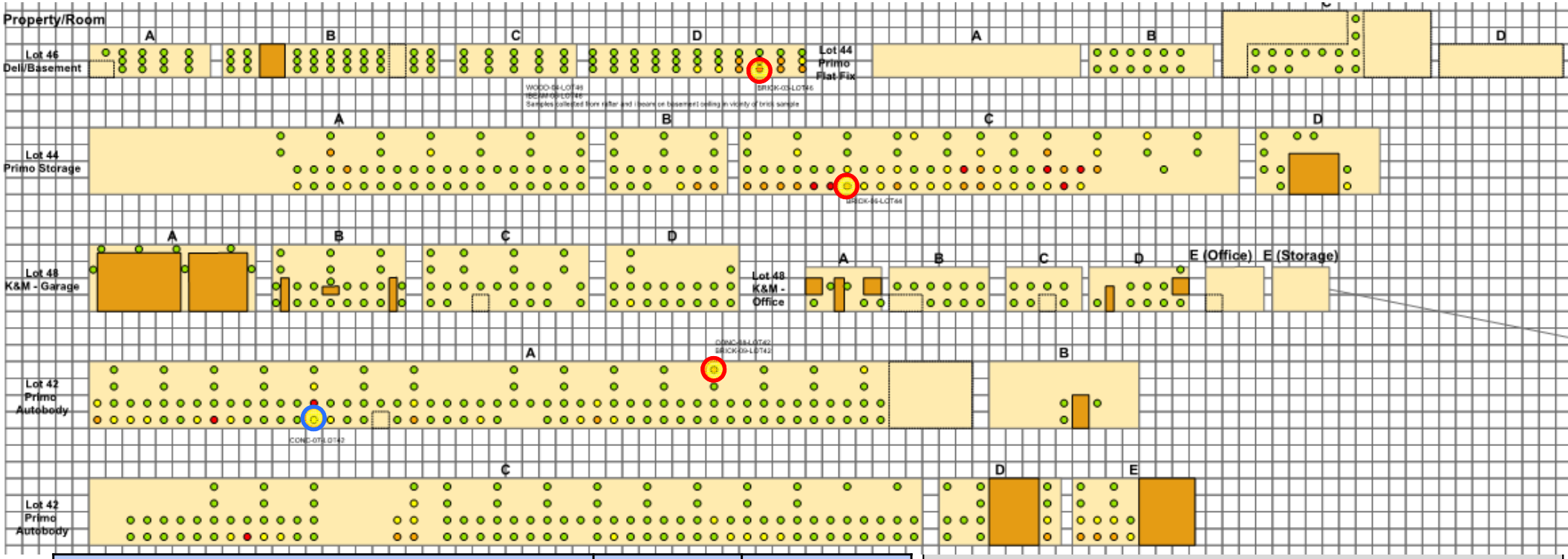
FWACC Building Investigation - Gamma Surveys

Gamma Floor Survey

- Results used to target soil boring locations
- Several elevated areas
  - Deli basement
  - Sump in lot 33



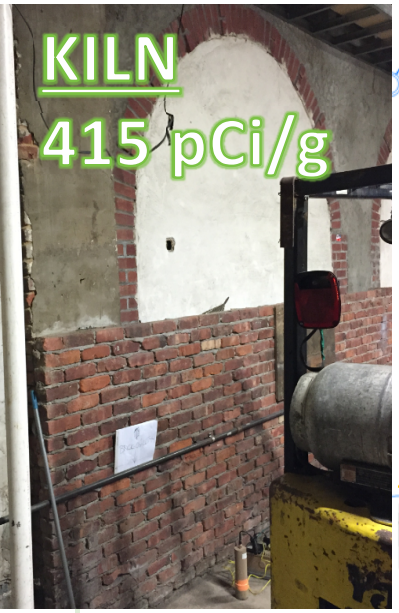
FWACC Building Investigation - Interior Walls

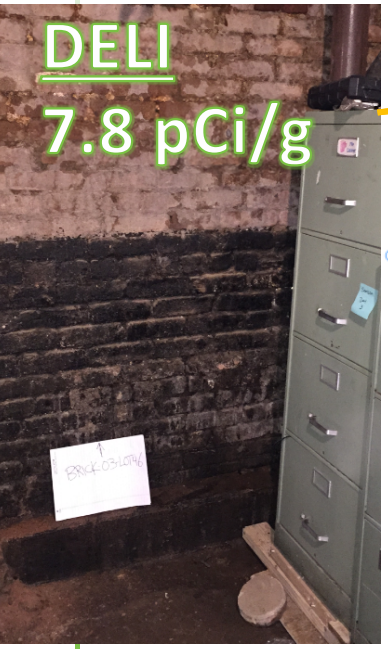


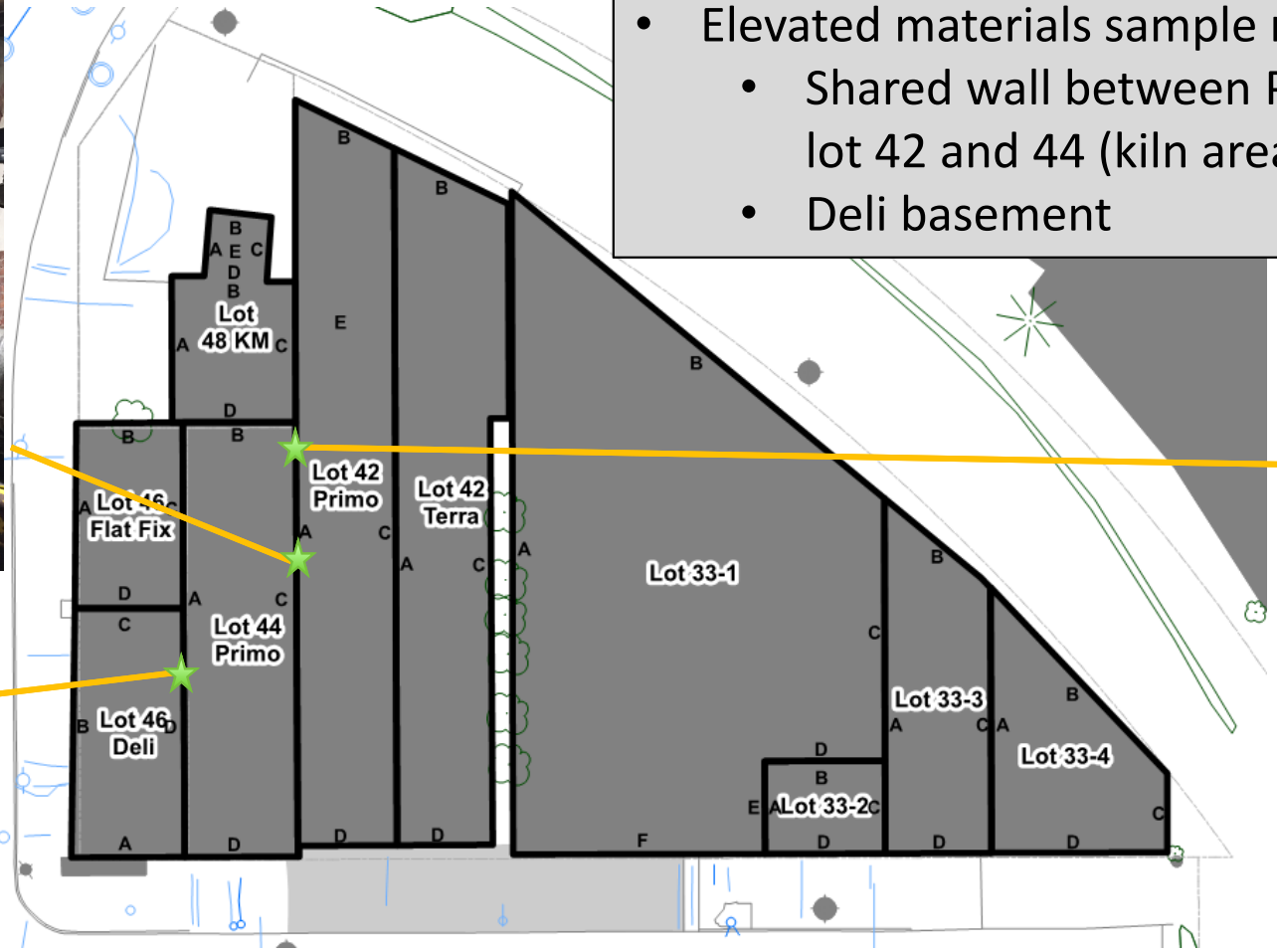
Comments/Location Description	Pre-Sampling Total	Removable (Wipe Samples)
	Alpha (dpm/100cm²)	
Cinder block from Lot 33	63	0
Brick from Lot 33	131	0
In Primo Auto Body main shop (Lot 42)	575	2
Concrete collected in Primo Auto main shop (Lot 42)	724	2
Brick collected in Primo Auto main shop (Lot 42) but underneath the overlying concrete	2,363	0
In Primo Auto Body auxillary shop (Lot 44). Brick from short brick wall in front of one of the arches	27,365	0
Brick In basement of deli (Lot 46)	10,376	0
Wood from basement of deli (Lot 46)	63	0
Rusted steel from I-beam in basement of Jarabacoa Deli	59	0

- Gamma results used to locate removable and fixed contamination sampling locations
- Alpha/beta and wipe sampling indicated contamination is fixed
- Most impacted areas
  - Shared wall between Primo lot 42 and 44
  - Deli basement

FWACC Building Investigation - Building Material sampling







- Elevated materials sample results:
  - Shared wall between Primo lot 42 and 44 (kiln area)
  - Deli basement

FWACC Building Investigation - Hazardous Building Material Survey

Asbestos-containing materials (ACM), suspected ACM, lead-based paint (LBP), and suspected LBP components and other potential hazardous materials were identified during the survey throughout all of the building structures

- ACM in tar used in construction, wire insulation and electrical panels, roofing materials, window caulking, interior construction materials
- LBP in TerraNova, Primo Flat Fix, Deli, Private apartments, Lot 48 exterior
- Assumed mercury containing fluorescent light bulbs and wall thermostats throughout

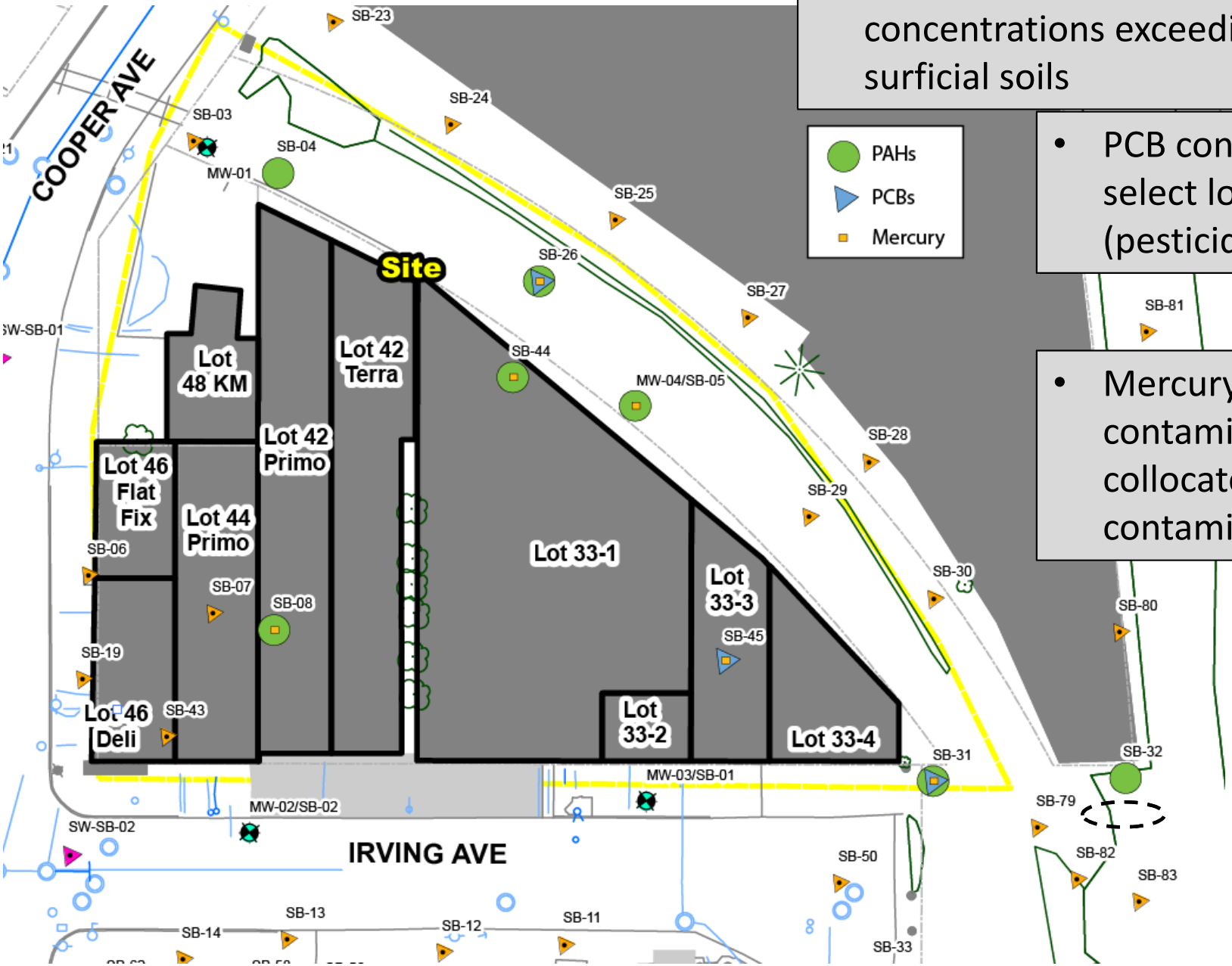
Soil Investigation Results

Soil Investigation– Chemical Results (FWACC)

- PAHs, arsenic, iron - Widespread concentrations exceeding criteria in surficial soils

- PCB contamination at select locations (pesticides collocated)

- Mercury contamination collocated with other contamination



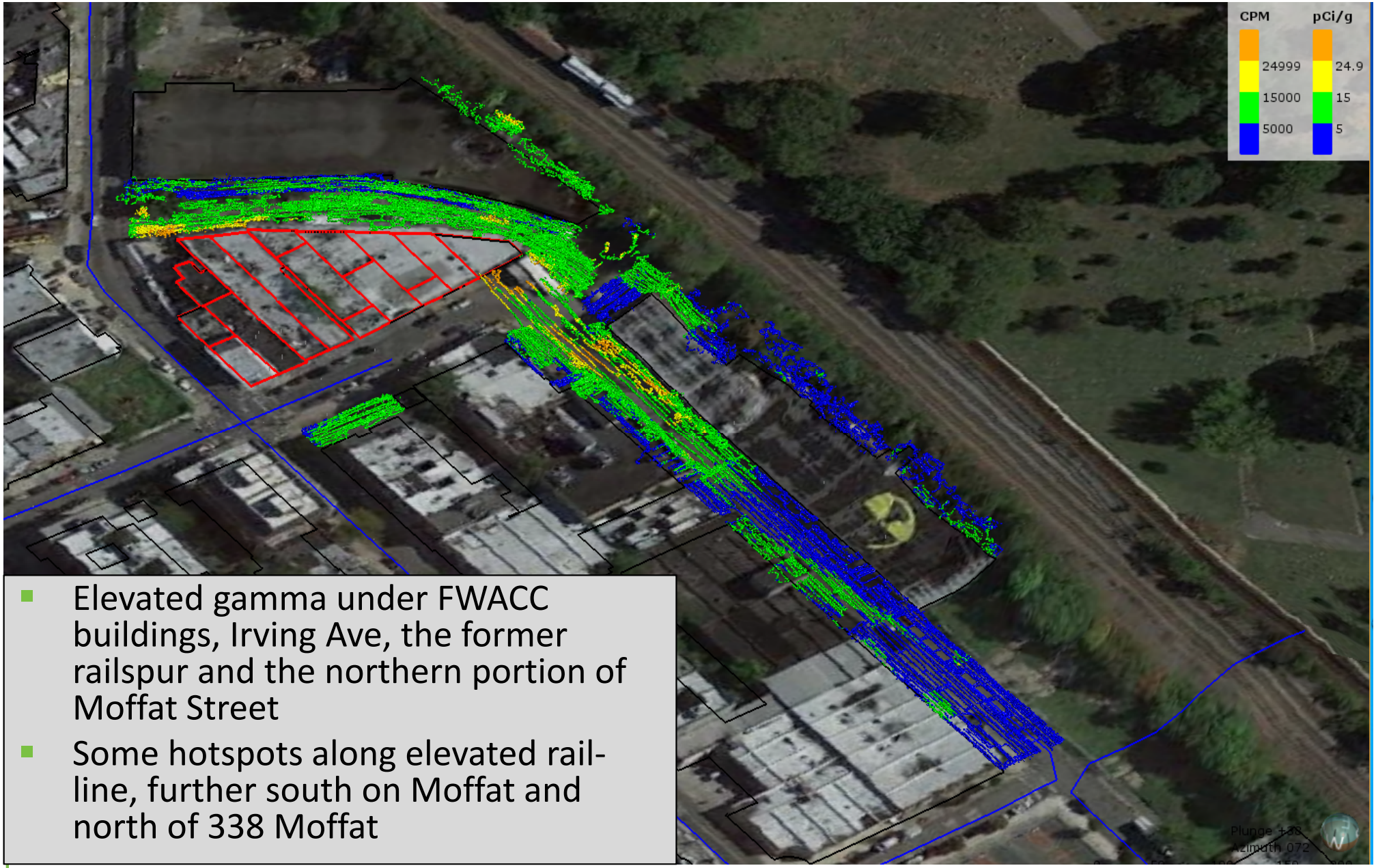
Soil Investigation
- Chemical Results (Adjacent Properties)

- Adjacent properties show similar or higher concentrations
- 308 Cooper Street (empty lot)
  - PAHs – Concentrations similar to or greater than those observed at the FWACC
  - Metals - detected in all samples at concentrations similar to or greater than those observed at the FWACC (copper, lead, mercury, and zinc)
- 335 Moffat Street (former ice building)
  - Only analyzed for VOCs and SVOCs – all below the NYSDEC Unrestricted SRSs

Soil Investigation - Radiological Results

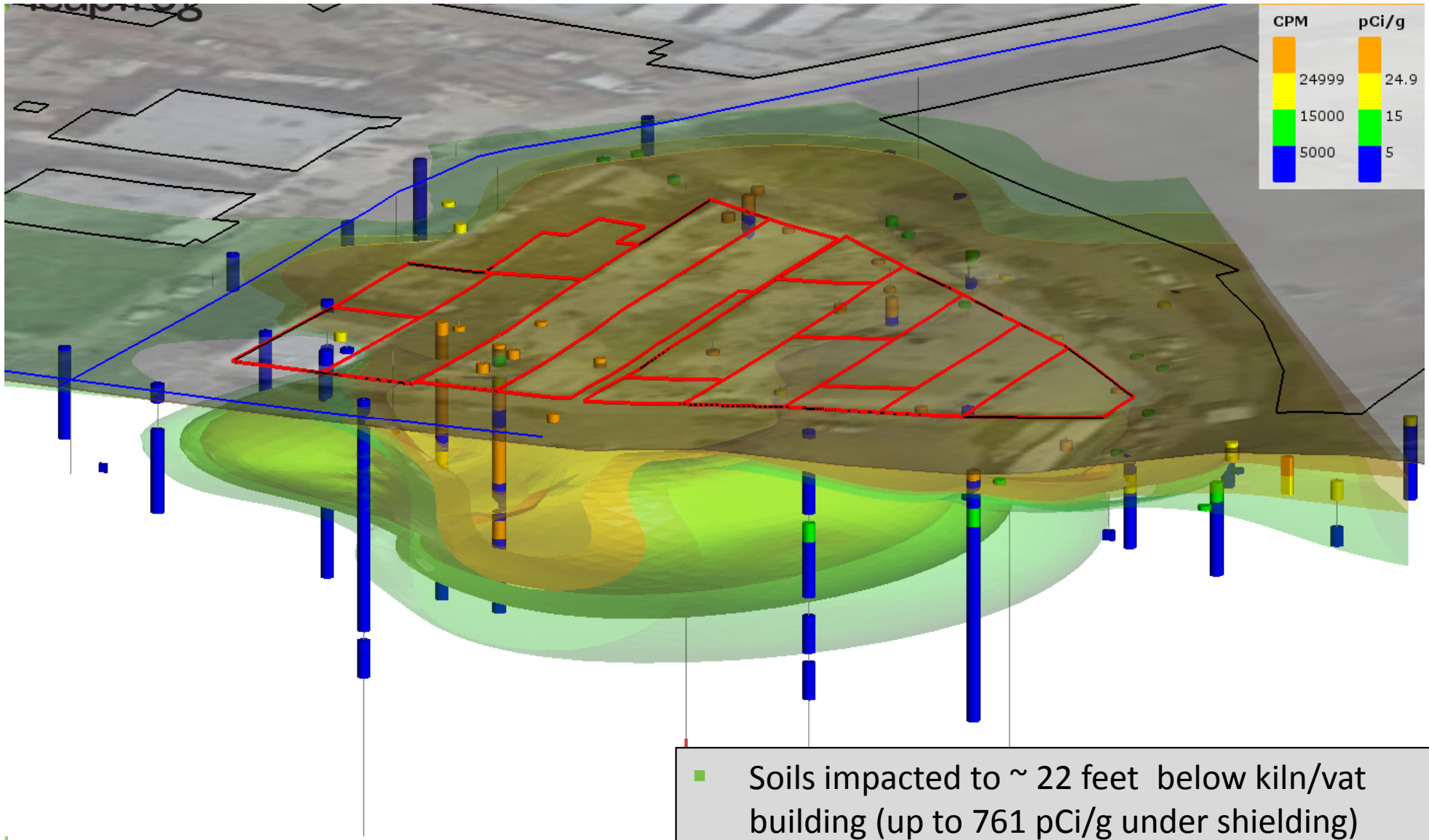
- Surficial Gamma Surveys
- Soil Results
  - Under the FWACC Building - surficial contamination in former yards and also depth under kiln /vats
  - Irving and Moffat – surficial contamination related to tailings/ runoff
  - Former Rail Spur Area – surficial contamination related to tailings/ runoff
  - Other Adjacent Areas
- (PRESENT USING 3D MODEL – placeholders follow)

Soil Investigation – Surficial Gamma Surveys



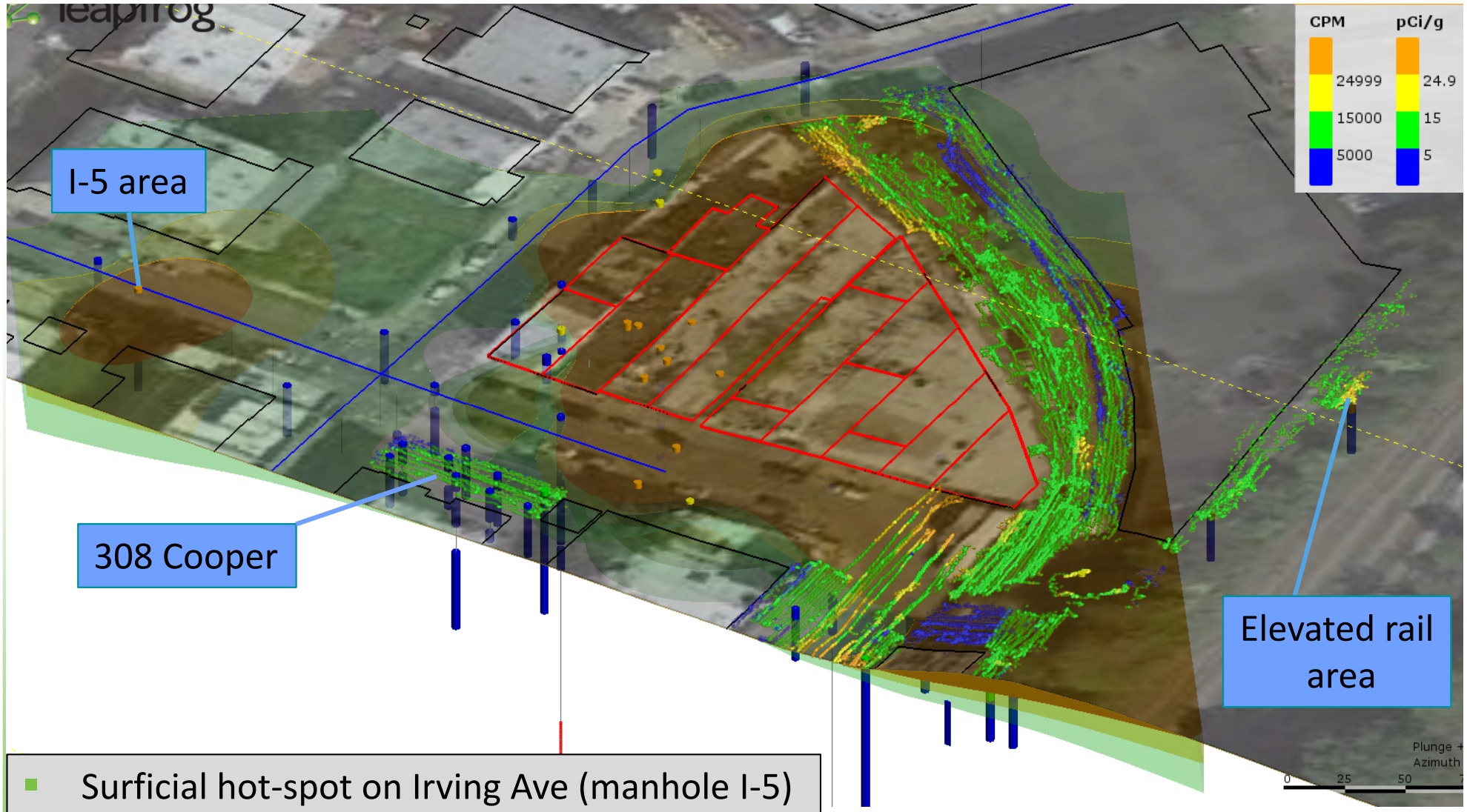
- Elevated gamma under FWACC buildings, Irving Ave, the former railspur and the northern portion of Moffat Street
- Some hotspots along elevated rail-line, further south on Moffat and north of 338 Moffat

Soil Investigation – FWACC Area



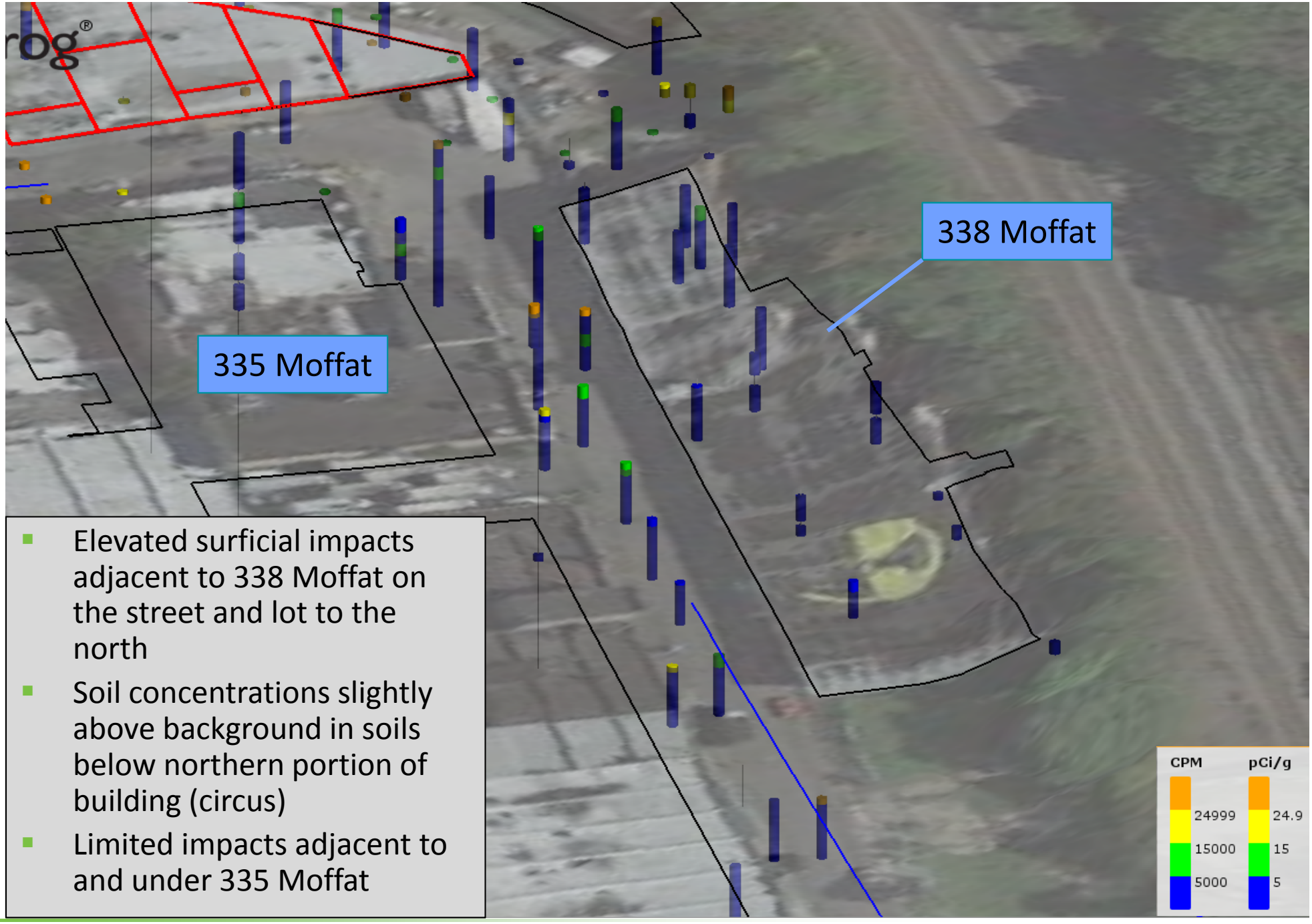
- Soils impacted to ~ 22 feet below kiln/vat building (up to 761 pCi/g under shielding)
- Adjacent areas likely contaminated by filling with tailings or source materials, or surficial runoff
- Impacts at Moffat Irving Intersection and former railspur are mostly surficial (up to 249 pCi/g)

Soil Investigation – Adjacent Areas



- Surficial hot-spot on Irving Ave (manhole I-5)
- Limited on 308 Cooper St
- Adjacent to Cabinet Maker
- Limited adjacent to and under 335 Moffat

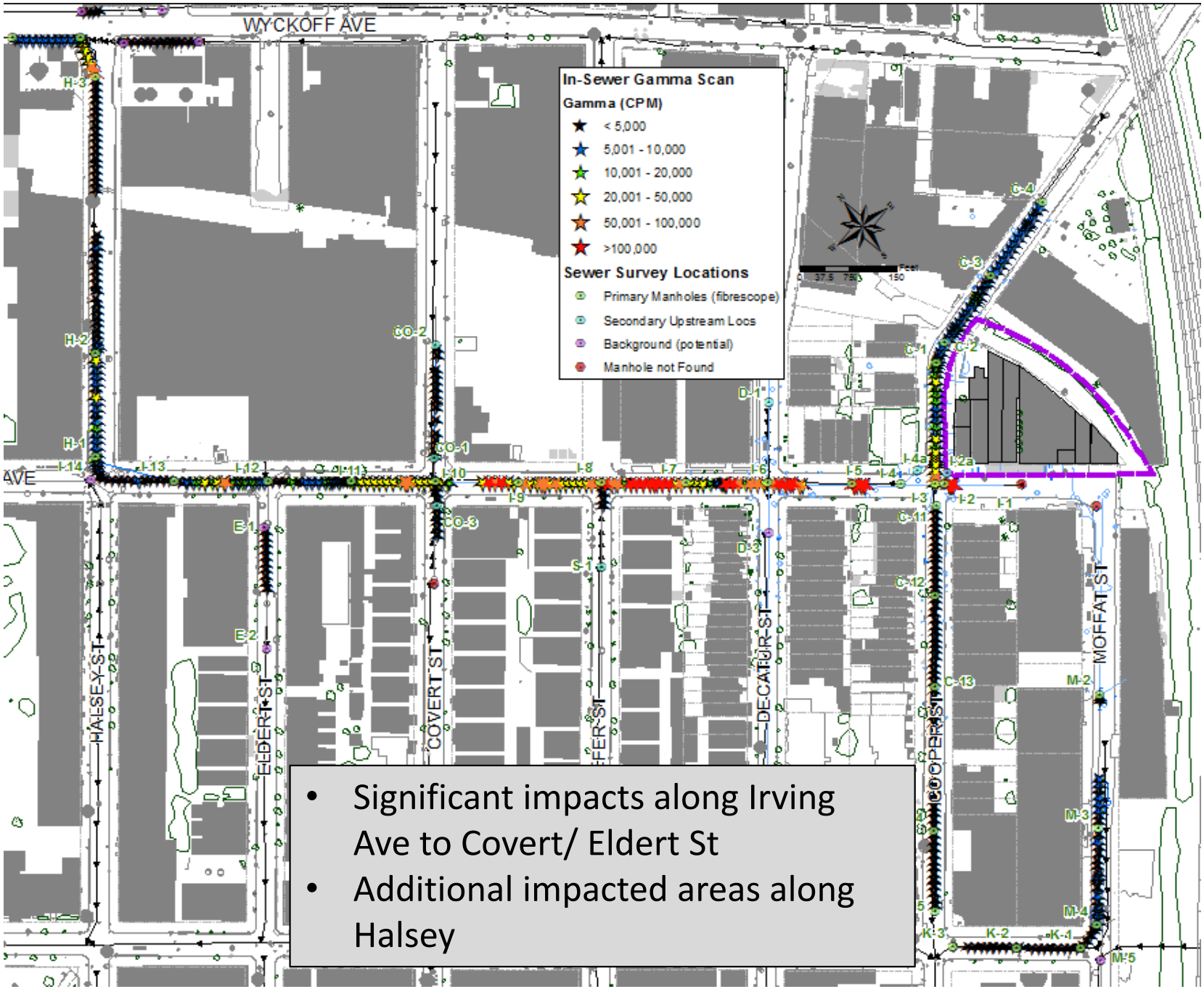
Soil Investigation – Moffat Street



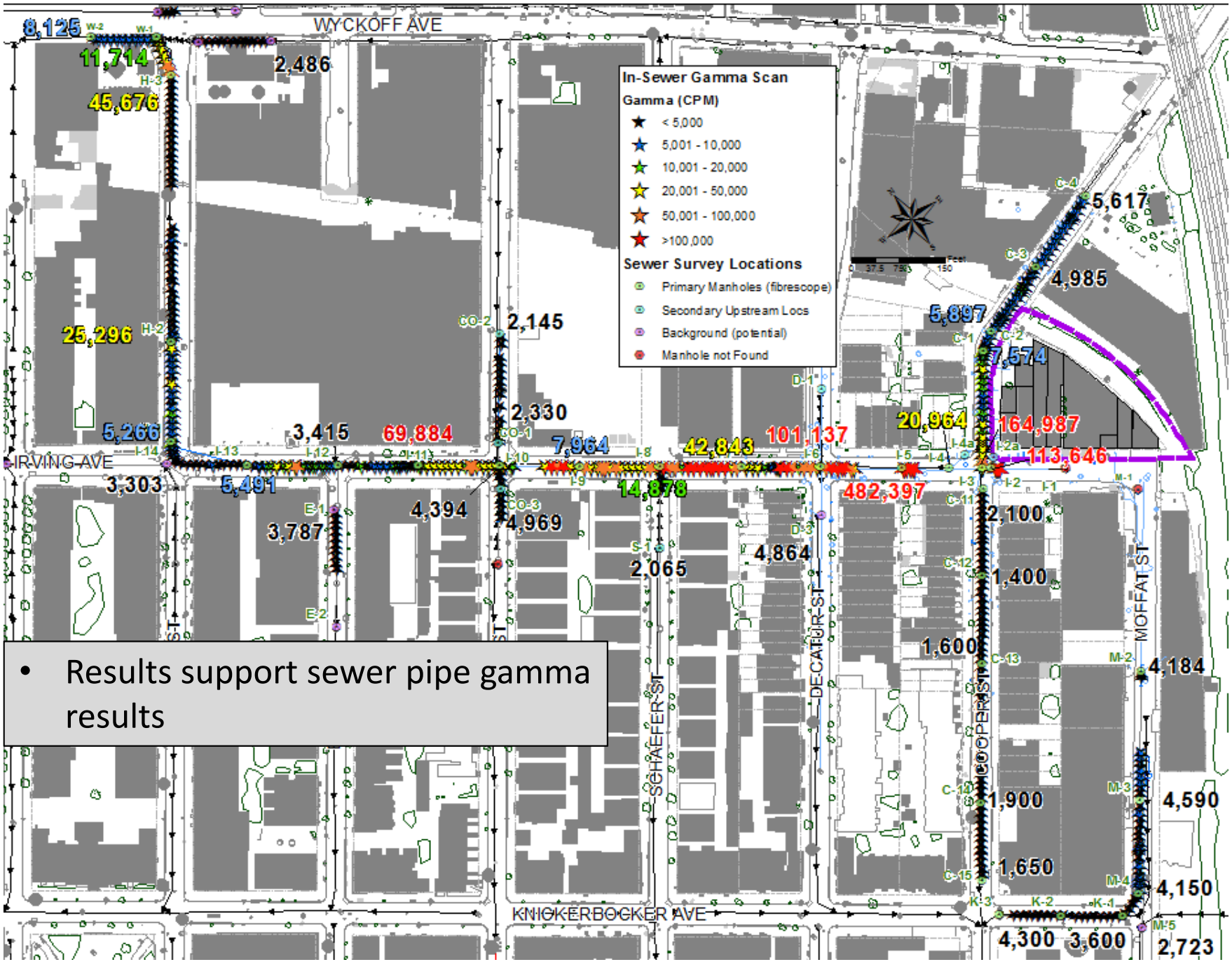
- Elevated surficial impacts adjacent to 338 Moffat on the street and lot to the north
- Soil concentrations slightly above background in soils below northern portion of building (circus)
- Limited impacts adjacent to and under 335 Moffat

Sewer Investigation Results

Sewer Investigation Results – Pipe Gamma Scan

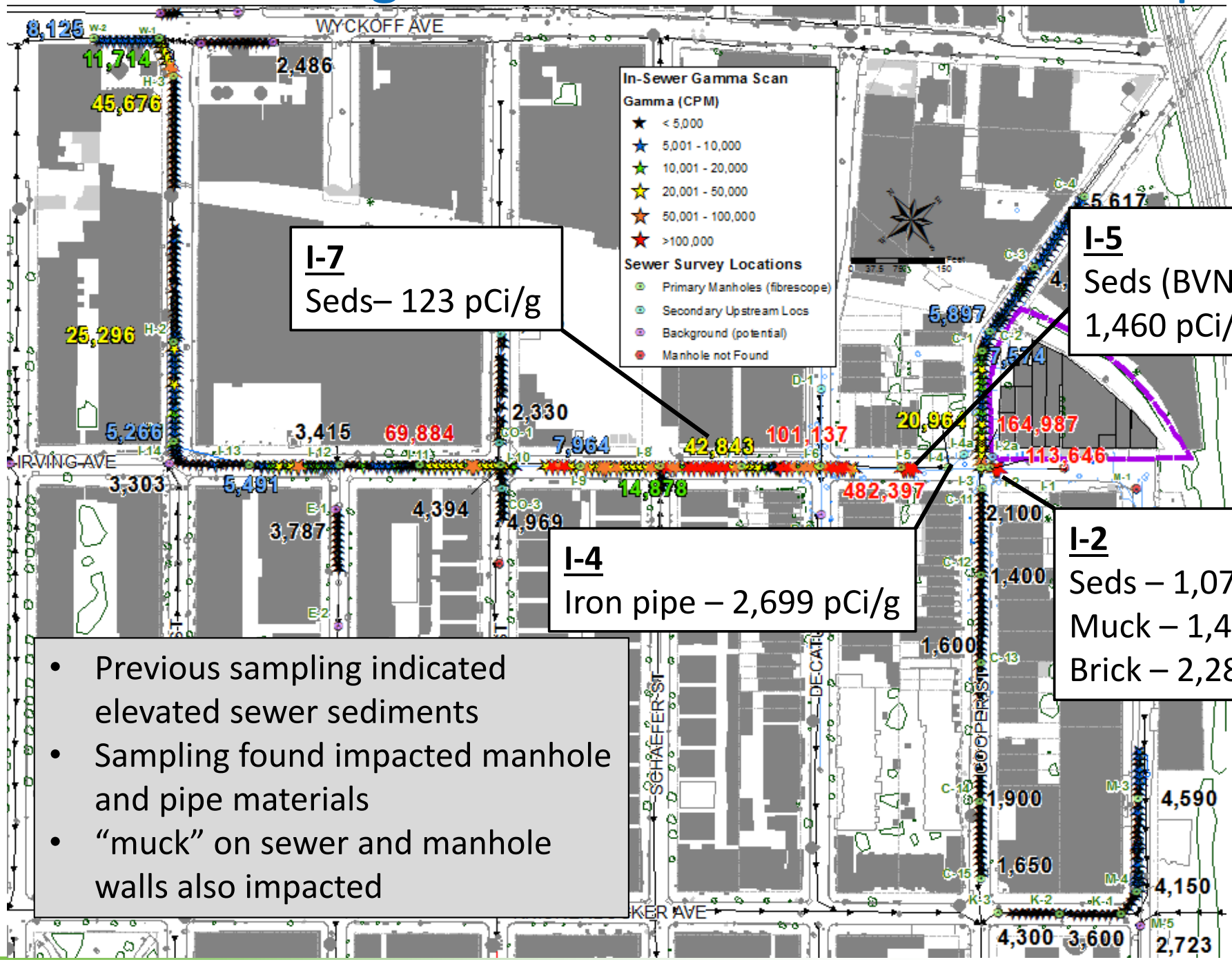


Sewer Investigation Results – Manhole Scans



- Results support sewer pipe gamma results

Sewer Investigation Results – Materials Samples



I-7
Seds– 123 pCi/g

I-5
Seds (BVNA) – 1,460 pCi/g

I-4
Iron pipe – 2,699 pCi/g

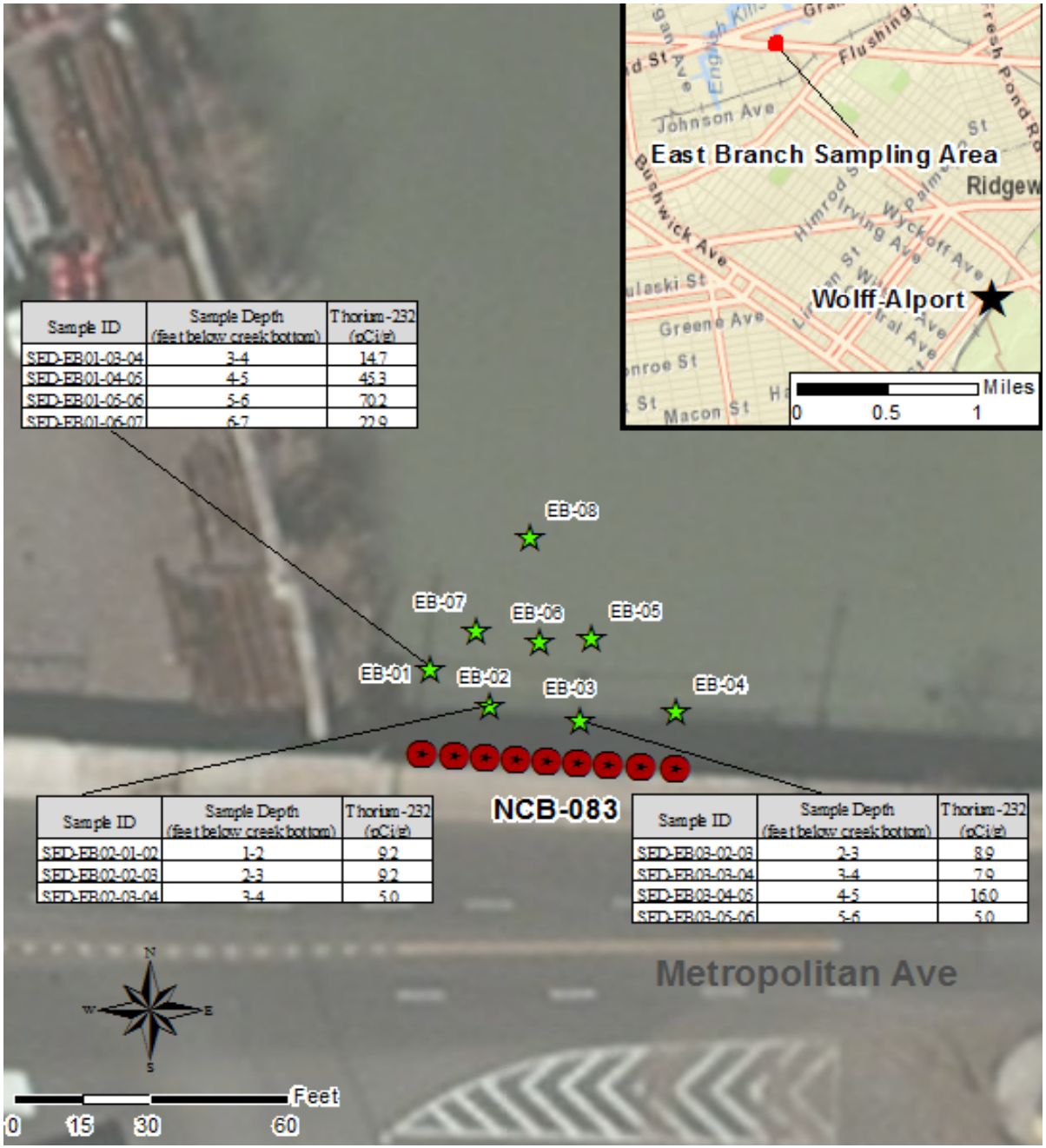
I-2
Seds – 1,079 pCi/g
Muck – 1,419 pCi/g
Brick – 2,283 pCi/g

- Previous sampling indicated elevated sewer sediments
- Sampling found impacted manhole and pipe materials
- "muck" on sewer and manhole walls also impacted

Newtown Creek Outfall Sediment Investigation Results

Newtown Creek Sediment Sampling Results

- Maximum Th-232 at EB-03
- Elevated at depths between 2 and 8 feet bgs
- Decreases to screening criteria moving away from outfall
- All results below ecological screening criteria



Sample ID	Sample Depth (feet below creek bottom)	Thorium-232 (pCi/g)
SED-EB01-03-04	3-4	14.7
SED-EB01-04-05	4-5	45.3
SED-EB01-05-06	5-6	70.2
SED-EB01-06-07	6-7	22.9

Sample ID	Sample Depth (feet below creek bottom)	Thorium-232 (pCi/g)
SED-EB02-01-02	1-2	9.2
SED-EB02-02-03	2-3	9.2
SED-EB02-03-04	3-4	5.0

Sample ID	Sample Depth (feet below creek bottom)	Thorium-232 (pCi/g)
SED-EB03-02-03	2-3	8.9
SED-EB03-03-04	3-4	7.9
SED-EB03-04-05	4-5	16.0
SED-EB03-05-06	5-6	5.0

Groundwater Investigation Results

Groundwater Investigation Results

- Hydrogeology
  - GW - ~65 ft bgs
  - GW flow generally north to south; Hydraulic conductivity 10-60 ft/day
- Four VOCs exceeded criteria (PCE, TCE, CIS, chloroform)
  - Maximum concentrations in MW-04 and MW-01s
- Thorium-232
  - Round 1 – all non-detect
  - Round 2 – one detection - 11 pCi/L in MW-5 (down gradient well)

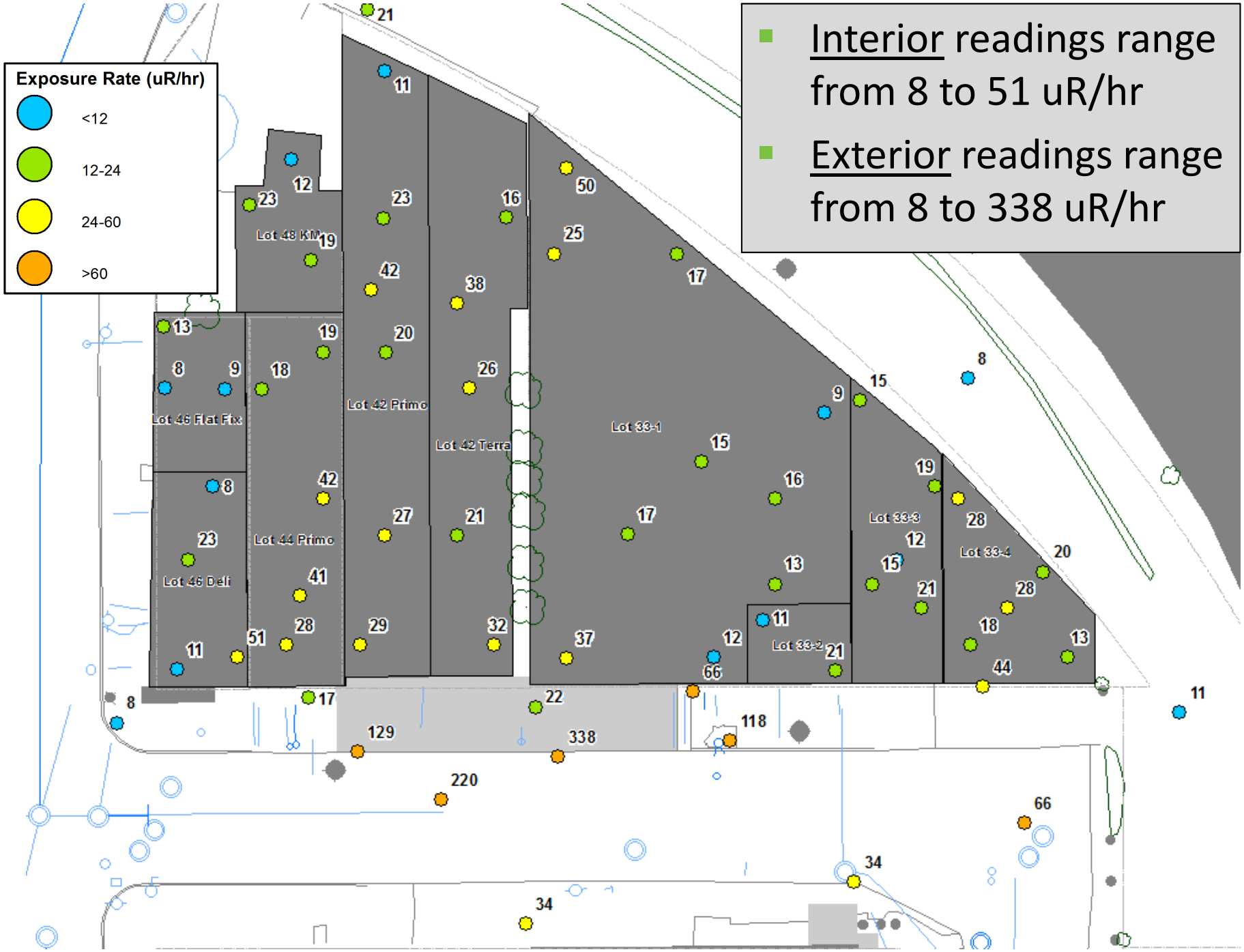
School and Daycare Radon/ Thoron Surveys

School and Daycare Radon/Thoron Surveys

- School
  - CC – Radon 0.1 ± 0.2 pCi/L to 0.4 ± 0.3 pCi/L; Results below the screening criteria of 1.15 pCi/L
  - ATDs – Six-month
    - ✓Radon – 0.2 ± 0.2 pCi/L to 1.4 ± 0.07 pCi/L; Results below screening criteria of 1.15 pCi/L
    - ✓Thoron – 0.2 ± 0.2 pCi/L to 1.3 ± 0.07 pCi/L
- Daycare
  - CC – Radon 0.2 ± 0.2 pCi/L to 0.7 ± 0.2 pCi/L; Results below the screening criteria of 1.15 pCi/L

FWACC Dose Rate Confirmation Surveys

FWACC Exposure Rate Confirmation Surveys

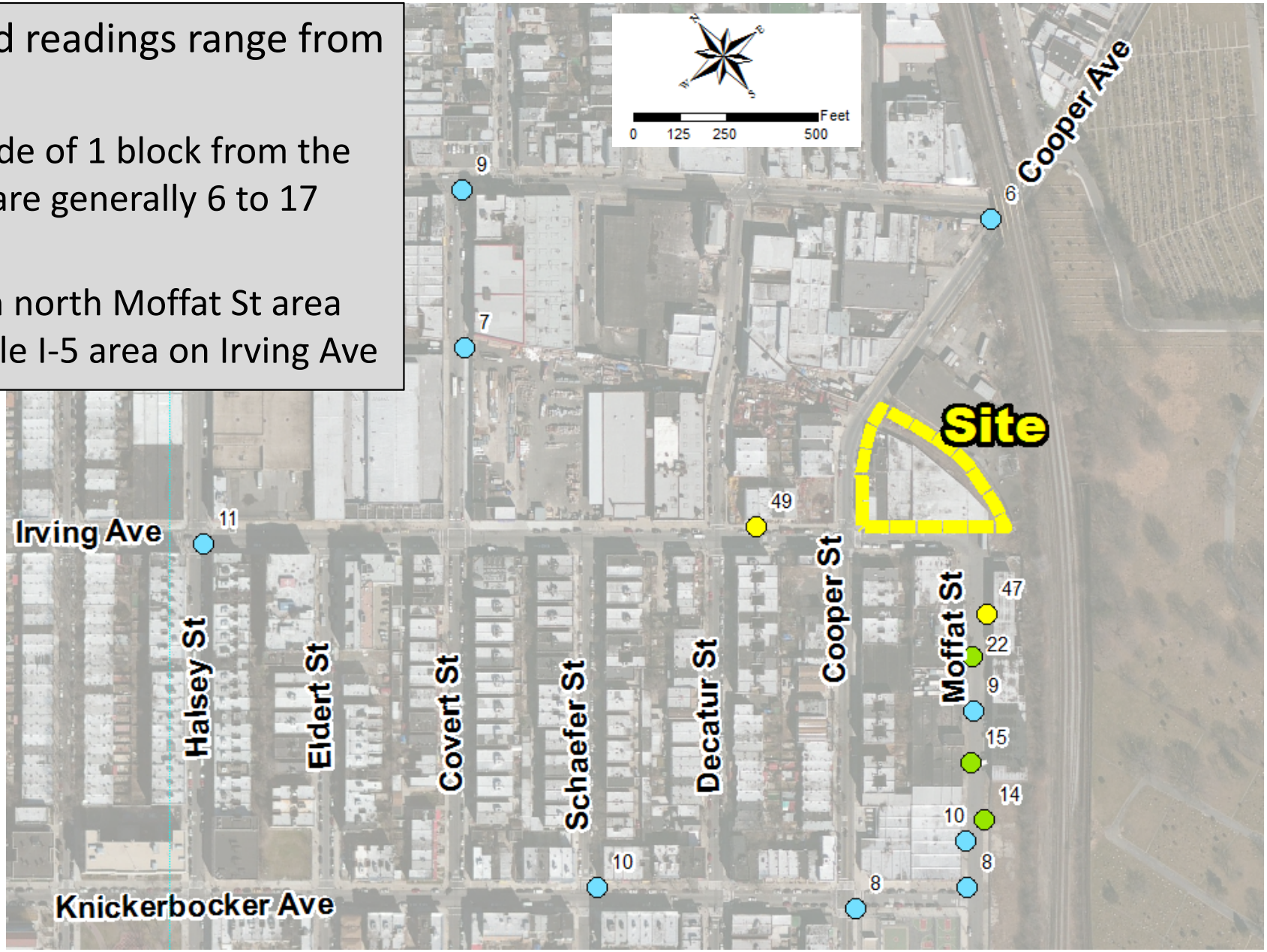


- Interior readings range from 8 to 51 uR/hr
- Exterior readings range from 8 to 338 uR/hr

Neighborhood Exposure Rate Confirmation Survey

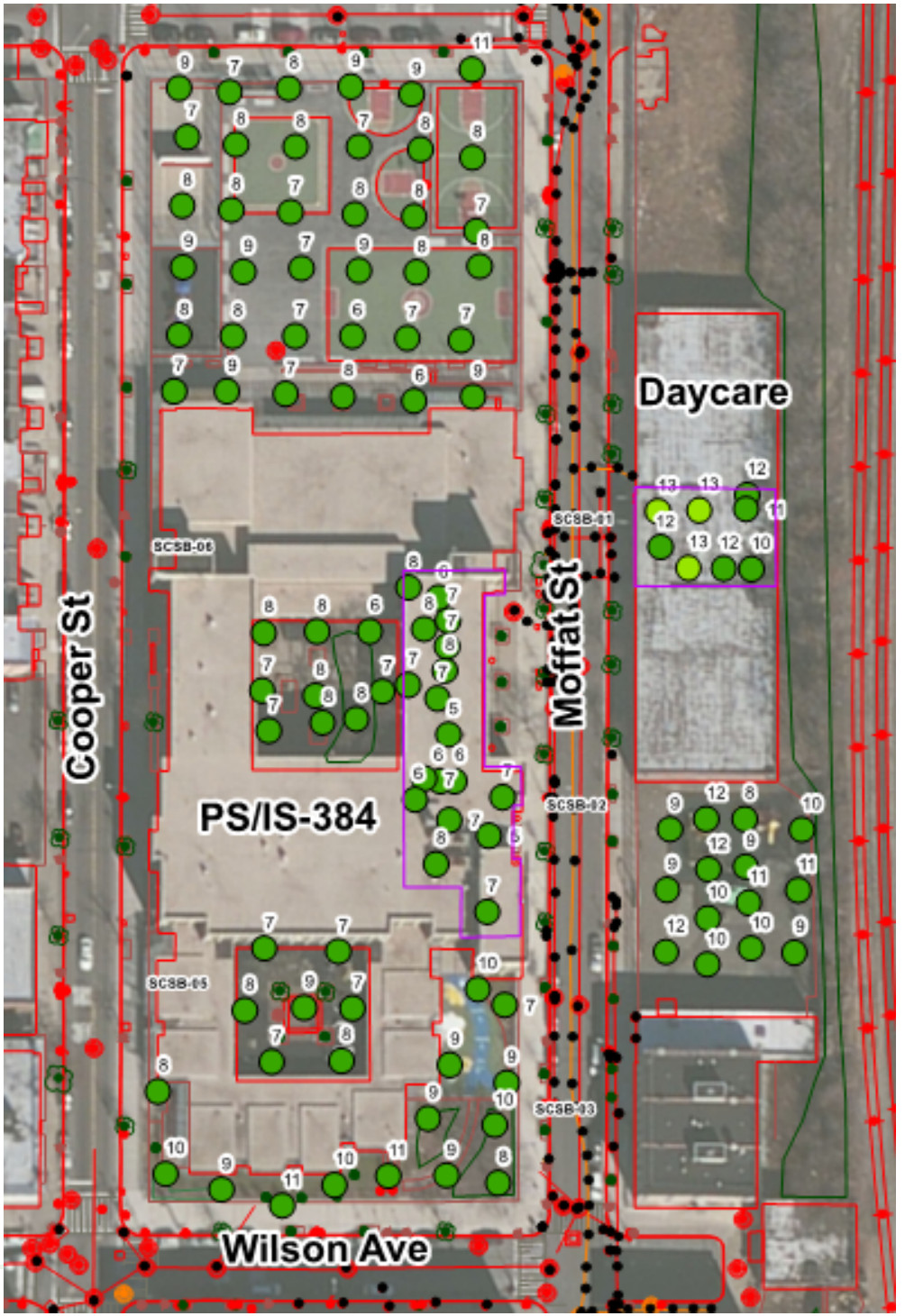
Neighborhood readings range from 6 to 49 uR/hr

- Areas outside of 1 block from the site radius are generally 6 to 17 uR/hr
- Elevated on north Moffat St area and manhole I-5 area on Irving Ave



Exposure Rate Confirmation Survey Results – Schools

- PS/IS-384
  - Exposure rates at the school range from 6 to 11 uR/hr
- Daycare
  - Exposure rates at the daycare range from 8 to 13 uR/hr



Questions

Risk Assessments

Human Health Risk Assessment

- PAR Tables 1 through 6 submitted to EPA
- Receptors:
  - Commercial Indoor Worker (Current and Future)
  - Industrial Worker (Current and Future)
  - Trespassers (Current and Future)
  - Public (Current and Future)
  - Offsite Receptors (Current and Future)
  - Future Residents (adult and child)
  - Future Construction/Utility Worker
- Media of Concern
  - Surface/subsurface soil, outdoor surfaces, outdoor air, indoor surfaces, indoor air, groundwater, sewer sediment
- Exposure Pathways
  - External radiation, inhalation, ingestion, and dermal

Screening-Level Ecological Risk Assessment

- Draft SLERA memo was submitted to EPA on July 12,2016
- Due to the limited habitat for most ecological receptors, the SLERA focused on possible site-related exposures at a Combined Sewer Overflow Discharge location in Newtown Creek
- All detections of radionuclides in sediment were below biota concentration guides (screening levels) estimated using the RESRAD-Biota model
- Additional evaluation for ecological receptors was not recommended

Summary

Conclusions

- **Building materials** – Contamination remains in the building structures at FWACC
- **FWACC Soils** – Highest levels of contamination in soil remain below the processing areas of FWACC, to depths less than 25 feet bgs
- **Adjacent areas** – surficial soils impacted in the former railroad spur area, below the road and sidewalks on Irving Ave and Moffat Rd and along the elevated rail line to the east
- **Sewer** – Irving Ave sewer line impacted from Moffat St to Covert St due to WACC disposal practices

Conclusions (cont.)

- **Sediment (Newtown Creek Outfall)** – Th-232 concentrations elevated at outfall, but limited to area immediately adjacent to discharge
- **Groundwater** – limited radiological contamination detected
- **School and Daycare** – radon/ thoron sampling, exposure measurements and soil borings detected no contamination
- **Gamma Exposure Rates** – elevated exposure rates found within buildings, on sidewalks and on the streets near the FWACC property

Uncertainties

- Sewer on Wyckoff past Halsey
- Sewer bedding material
- Confirmation of GW contamination

Path Forward/ Schedule

- Draft HHRA Report – 10/21/16
- Final HHRA Report – 12/13/16
- Draft RI Report – 11/18/16
- Final RI Report – 1/27/16
- Draft FS Report – 2/24/16
- Final FS Report – 4/28/16